March 28, 1967 W. C. WHITAKER ETAL 3,311,034

METHOD AND APPARATUS FOR MAKING A CIGARETTE PACKAGE CONSTRUCTION OR THE LIKE

Filed March 16, 1964 4 Sheets-Sheet 1

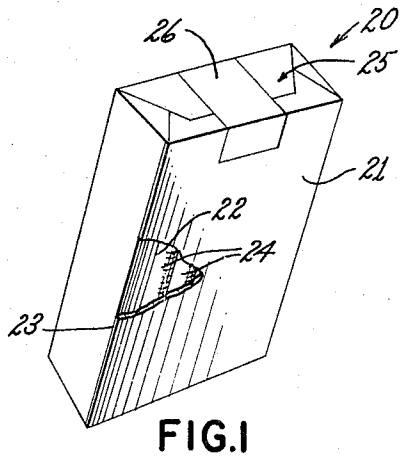


FIG.1

FIG.2

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Filed March 16, 1964 4 Sheets-Sheet 2

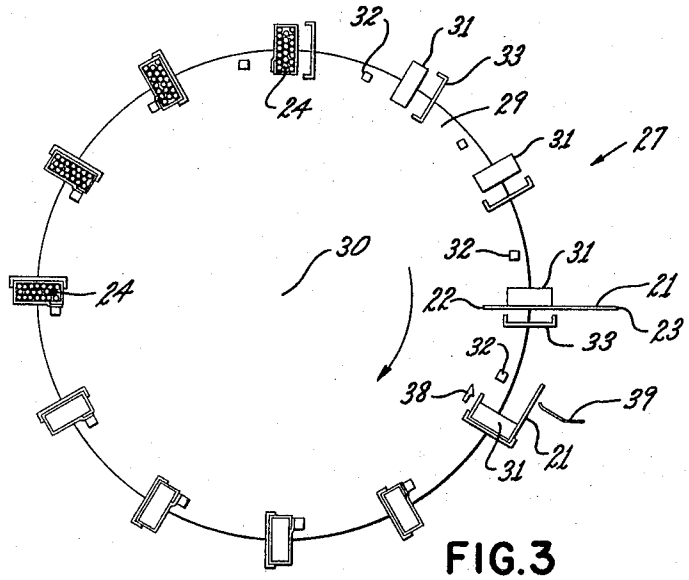


FIG.3
PRIOR ART

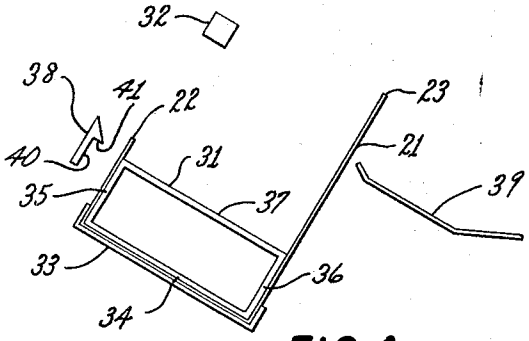


FIG.4
PRIOR ART

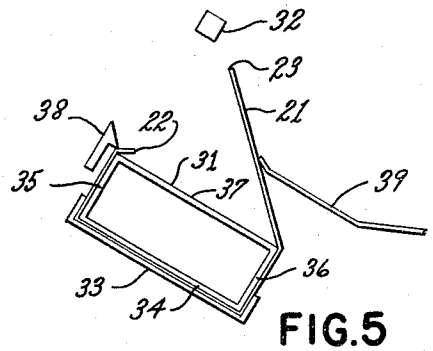


FIG.5
PRIOR ART

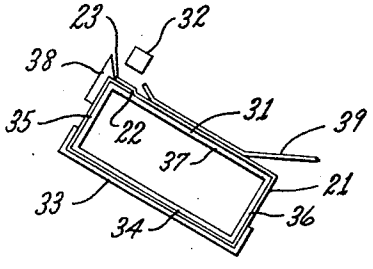


FIG.6
PRIOR ART

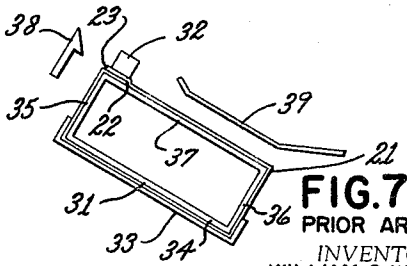


FIG.7
PRIOR ART

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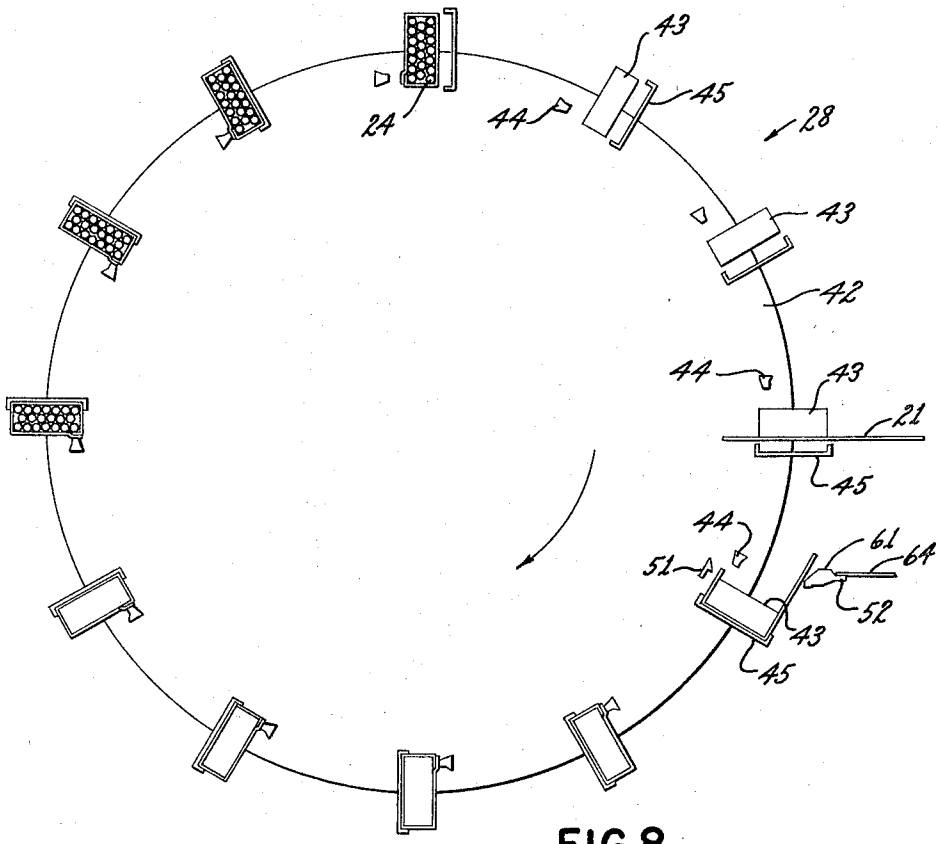


FIG.8

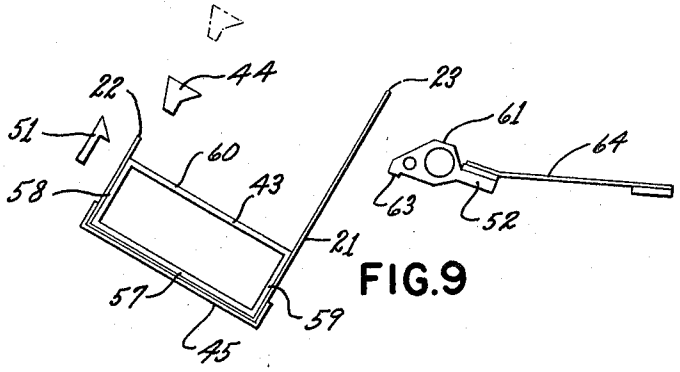


FIG.9

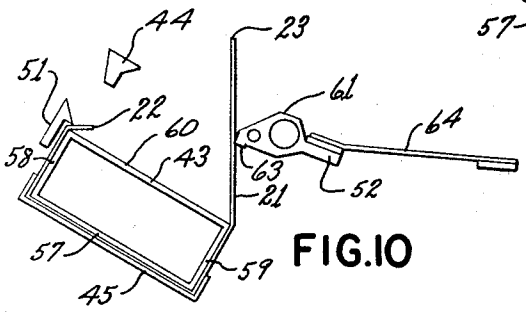


FIG.10

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METHOD AND APPARATUS FOR MAKING A CIGARETTE PACKAGE CONSTRUCTION OR THE LIKE

Filed March 16, 1964 4 Sheets-Sheet 4

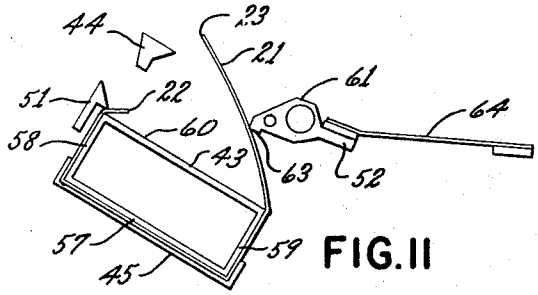


FIG.11

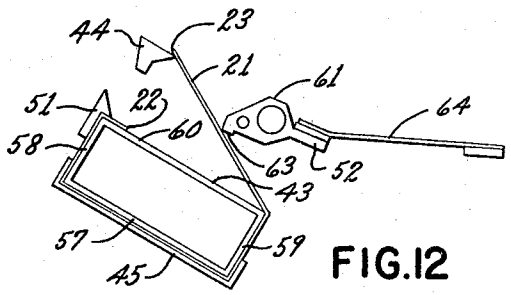


FIG.12

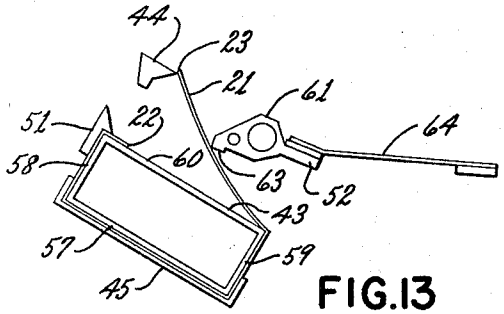


FIG.13

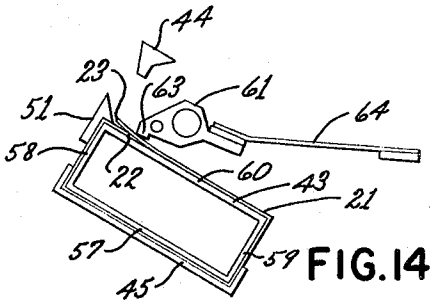


FIG.14

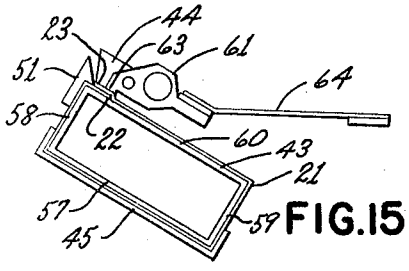


FIG.15

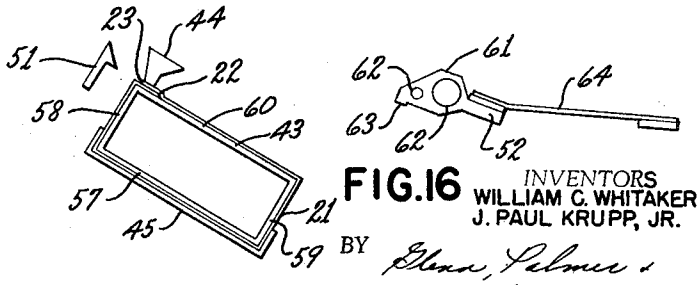


FIG.16

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3,311,034

METHOD AND APPARATUS FOR MAKING A CIGARETTE PACKAGE CONSTRUCTION OR THE LIKE

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Filed Mar. 16, 1964, Ser. No. 352,084
16 Claims. (Cl. 93—44.1)

This invention relates to an improved apparatus and method for making a receptacle from a blank of material or the like.

It is well known that a cigarette package construction or the like can be formed by providing a flat blank of material, such as a laminated sheet of material comprising aluminum-containing foil or the like laminated to paper, plastic or other material, to form the entire surrounding structure for the cigarettes or the like whereby the conventional cellophane overwrap for cigarette package constructions as well as the conventional tubular paper casing therefor can be eliminated.

It is also well known that a conventional method and apparatus have been provided for folding such a blank of material into a rectangular tubular form whereby the overlapping ends of the flat blank of material are adhesively secured in overlapping relation by conventional adhesive means.

However, such prior known method and apparatus are not readily adaptable for effecting a heat sealing together of the overlapping edges of the blank in such a manner that the aforementioned tubular package construction can be effectively formed by the conventional apparatus.

According to the teachings of this invention, however, an improved method and apparatus are provided for forming a receptacle for cigarettes or the like in such a manner that the overlapping ends of a flat blank of material forming the receptacle for the cigarettes can have the overlapping ends thereof effectively heat sealed together while utilizing substantially conventional equipment modified in a manner hereinafter set forth.

Accordingly, it is an object of this invention to provide an improved apparatus for making a receptacle or the like from a blank of material or the like.

Another object of this invention is to provide an improved method for making such a receptacle or the like.

Other objects, uses and advantages of this invention are apparent from a reading of this description which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a perspective view illustrating the improved package construction of this invention.

FIGURE 2 is a fragmentary, perspective view illustrating the various moving parts of the apparatus of this invention.

FIGURE 3 is a schematic end view of the prior art receptacle making apparatus.

FIGURES 4–7 are respectively enlarged schematic views illustrating the function of the moving part of the apparatus illustrated in FIGURE 3.

FIGURE 8 is a view similar to FIGURE 3 and illustrates the improved method and apparatus of this invention.

FIGURES 9–16 are respectively enlarged schematic views of the apparatus illustrated in FIGURE 8 and respectively illustrate the sequence for forming the receptacle of this invention.

While the various features of this invention are hereinafter described and illustrated as being particularly

adaptable for forming a receptacle for cigarettes or the like, it is to be understood that the various features of this invention can be utilized singly or in any combination thereof to provide a receptacle for other purposes as desired.

Therefore, this invention is not to be limited to only the embodiments illustrated in the drawings, because the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

Referring now to FIGURE 1, an improved receptacle of this invention is generally indicated by the reference numeral **20** and comprises a sheet of material **21** first formed in open ended tubular form by having the opposed ends **22** and **23** disposed in overlapping relation as illustrated in FIGURE 1 and effectively secured together in a manner hereinafter described, the tubular blank **21** subsequently having the conventional number of cigarettes **24** inserted therein and having the opposed ends thereof suitably folded in a conventional manner to provide the top and bottom flap structure **25**.

Subsequently, a conventional revenue stamp resembling tape **26** is disposed over the upper end of the receptacle **20** to permit opening of the package construction **20** in the conventional manner for dispensing the cigarettes **24**.

While the blank of material **21** can comprise any suitable material, the embodiment thereof illustrated in the drawing comprises a sheet of metallic foil, such as aluminum-containing metallic foil or the like, laminated to a sheet of paper or the like whereby the foil side of the blank **21** forms the exterior surface for the package construction **20** and can carry the desired advertising media or the like, the foil side of the blank **21** providing a substantially moisture-proof barrier surrounding the cigarettes **24**.

In the past, such a package construction **20** has been formed by a suitable apparatus and method wherein the overlapping edges or ends **22** and **23** of the blank of material **21** are secured together by conventional adhesive.

However, such prior known method and apparatus are not adaptable for securing the overlapping edges **22** and **23** of the blank **21** by a heat sealing operation as provided by the teachings of this invention.

In particular, the conventional apparatus for forming the package construction **20** wherein the overlapping ends **22** and **23** of the blank **21** are adhesively secured together is generally indiacted by the reference numeral **27** in FIGURE 3 and sufficient details of the operation thereof will now be described in order to better understand the method and apparatus of this invention which is generally indicated by the reference numeral **28** in FIGURES 2 and 8–16.

As illustrated in FIGURE 3, the prior art apparatus **27** comprises a wheel-like structure **29** rotatable about an axis **30** and carrying a plurality of hollow rectangular arbors **31**, movable hold-down means **32**, and movable folding means **33**, the wheel **29** being indexable to index each arbor **31** through twelve stations hereinafter referred to in the conventional manner as one o'clock station, two o'clock station, etc., through the twelve o'clock station.

As each arbor **31** is moved in a clockwise manner in FIGURE 3, the same eventually comes to the station disposed at the three o'clock position wherein the flat blank **21** is fed directly beneath the arbor **31** by conventional means.

As the arbor **31** is moved from the three o'clock position toward the four o'clock position, the substantially U-shaped folding member **33** is moved toward the arbor **31** to effectively fold the blank **21** against the sides **34**,

35 and 36 of the arbor 31 in the manner illustrated in FIGURES 3 and 4, whereby the opposed ends 22 and 23 of the blank 21 project outwardly beyond the fourth side 37 of the arbor 31 at right angles thereto, the end 22 projecting only a short distance beyond the side 37 while the end 23 projects beyond the same at a substantial distance for a purpose hereinafter described.

When the particular arbor 31 and folded blank 21 reach the four o'clock position illustrated in FIGURE 3 and FIGURES 4–7, the same are positioned adjacent a pair of folding members 38 and 29 carried by the apparatus 27 but are not movable with the wheel 29. With the blank 21 and arbor 31 at the four o'clock position, suitable mechanism is operated to cause the folding members 38 and 39 to simultaneously move inwardly toward the respective arbor 31 and fold the ends 22 and 23 of the blank 21 in overlapping relation as illustrated in FIGURE 6, the folding member 38 being substantially a right-angled arm having a surface 40 for engaging the blank 21 against the side 35 of the arbor 31 and having a surface 41 for bending the end 22 down against the side 37 of the arbor 31.

The folding member 38 comprises a substantially flexible arm which moves in substantially a straight line path toward the side 37 of the arbor 31 to fold the end 23 down against the side 37 of the arbor 31 and in overlapping relation over the folded end 22 of the blank 21.

With the ends 22 and 23 of the blank 32 now folded in overlapping relation, the same are secured together by a suitable adhesive, either applied to the exterior surface of the end 22 of the blank 21 or to the interior surface of the end 23 of the blank 21 or to both prior to the insertion of the blank 21 into the apparatus 27 at the three o'clock station thereof, whereby the overlapping ends 22 and 23 will be secured together by the conventional adhesive.

In order to hold the overlapping ends 22 and 23 in their secured position until the adhesive dries, the hold-down member 32 for the particular arbor 31 is moved downwardly from its normal position, as illustrated in FIGURE 5, to the position illustrated in FIGURE 7 to compact the overlapping portions of the ends 22 and 23 of the blank 21 against the side 37 of the arbor 31 and will remain in that position until the particular arbor 31 and folded blank 21 have been indexed to the twelve o'clock station, as illustrated in FIGURE 3.

As the particular folded blank 21 and arbor 31 are indexed from the four o'clock position illustrated in FIGURE 3, the cigarettes 24 are subsequently inserted therein and the package construction is ejected at the twelve o'clock station wherein the ends of the folded blank 21 can be subsequently closed to complete the package construction 20 illustrated in FIGURE 1.

Therefore, it can be seen that the prior art apparatus 27 can effectively form the package construction 21 of this invention when the overlapping ends 22 and 23 of the blank 21 are secured together by conventional adhesives.

However, according to the teachings of this invention, it is desirable for the overlapping ends 22 and 23 of the blank 21 to be heat sealed together to form the package construction 20, whereby the aforementioned gluing operation can be eliminated at the receptacle making apparatus.

In order to provide such a heat sealing method and apparatus, it has been found that the conventional apparatus 27 previously described must be modified in a manner now to be described.

As illustrated in FIGURES 2 and 8, the apparatus 28 of this invention includes a rotatable wheel 42 carrying a plurality of hollow rectangular arbors 43 movable through the twelve stations in a manner similar to the wheel 29, the wheel 42 carrying an improved hold-down member 44 and a folding means 45 for each arbor 43.

In particular, it can be seen in FIGURE 2 that the

hold-down member 44 for each arbor 43 is carried on the end of a piston rod 46 interconnected to a cylinder arrangement 47 attached to the wheel 42 by suitable bracket means 47'.

Similarly, the U-shaped folding member 45 for each arbor 43 is carried on the end of a piston member 48 interconnected to a cylinder member 49, the cylinder 49 being attached to the wheel 42 by bracket means 50.

A pair of folding members 51 and 52 are respectively carried by the apparatus 28 and are disposed at the four o'clock position thereof, the folding member 51 being carried on the end of a piston rod 53 actuated by a cylinder 54 while the folding member 52 is carried on a piston rod 55 actuated by a cylinder means 56.

In this manner, the folding means 51 and 52 do not rotate with the wheel 42 and sequentially operate on each arbor 43 as the respective arbor 43 is indexed to the four o'clock station.

While the means 44, 45, 51 and 52 are illustrated as being pneumatically or hydraulically operated in a manner hereinafter described, it is to be understood that the same can be electrically or mechanically operated in any other desired manner.

As illustrated in FIGURE 8, the flat blank 21 is fed into the apparatus 28 at the three o'clock position thereof below the arbor 43 to be folded against the sides 57, 58 and 59 of the arbor 43 by the folding means 45 in the manner previously described whereby the ends 22 and 23 of the blank 21 extend beyond the fourth side 60 of the particular arbor 43 in substantially the same manner as provided in the apparatus 27 previously described.

The folding member 51 is constructed in the same manner as the folding member 38 previously described and is adapted to be moved inwardly toward the arbor 43 at the four o'clock position thereof to bend the end 22 of the blank 21 against the side 60 of the arbor 43.

However, the folding member 52 of this invention has been modified from the folding member 39 previously described. In particular, the folding member 52 of this invention includes a head member 61 carrying a plurality of heating elements 62 which are electrically operated to provide sufficient heat at a foot portion 63 of the head 61 to heat seal the overlapping ends 22 and 23 of the blank 21 together, the head 61 being carried by a flexible arm 64 disposed between the head 61 and the piston rod 55 for a purpose hereinafter described.

Since the head 61 of the folding means 52 is being utilized to heat seal together the overlapping ends 22 and 23 of the blank 21 at the four o'clock station of the wheel 42, it can be seen that the head 61 of the folding means 52 is substantially heated whereby the same tends to cause the end 23 of the blank 21 to curl downwardly as the head 61 is moved from the position illustrated in FIGURE 9 toward the arbor 43 to perform its folding operation whereby such curling action of the heated end 23 of the blank 21 might cause the end 23 thereof to be inserted under the end 22 of the blank 21 before the end 22 thereof has been fully folded against the side 60 of the arbor 43 by the folding means 51.

Therefore, the holding member 44 for the particular arbor 43 is moved from the dotted line position illustrated in FIGURE 9 to the full line position illustrated in FIGURE 9 before the head 61 of the folding means 52 makes contact with the end 23 of the blank 21. Alternately, the hold-down member 44 can assume its most outward position in the full line position illustrated in FIGURE 9 rather than the full outward position as illustrated by the hold-down member 32 in FIGURE 4.

In any event, when the end 23 of the blank 21 tends to curl toward the side 60 of the arbor 43 in the manner illustrated in FIGURE 11, it can be seen that the same has its downward movement temporarily halted by the

hold-down member 44 in FIGURE 12 so that the folding means 51 can complete its folding operation to hold the end 22 against the side 60 of the arbor 43.

Thereafter, further inward movement of the folding member 52 causes the end 23 of the blank 21 to snap past the hold-down member 44 in the manner illustrated in FIGURES 13 and 14 so that the end 23 of the blank 21 will always be disposed over the folded end 22 of the blank 21.

Thereafter, the folding member 52 moves the head 61 thereof along the end 23 of the blank 21 until the head 61 has the foot 63 thereof disposed over the overlapping portions of the ends 23 and 22 in the manner illustrated in FIGURE 15 whereby the heated head 61 will heat seal the overlapping portions of the ends 22 and 23 of the blank 21 together, the blank 21 either having printed heat sealing means on the exterior side of the end 22 or the interior side of the end 23 thereof or both as desired.

Since the latent heat remains in the overlapping portions of the ends 22 and 23 of the blank 21, the hold-down member 44 is moved downwardly from the position illustrated in FIGURE 14 to the position illustrated in FIGURE 15 whereby it can be seen that the particular configuration of the hold-down member 44 permits the hold-down member 44 and foot 63 of the head 61 to simultaneously engage the overlapping portions of the ends 22 and 23 of the blank 21.

Thereafter, the folding members 51 and 52 are moved outwardly in the manner illustrated in FIGURE 16 whereby the wheel 42 can proceed to index the particular arbor 43 and folded blank 21 beyond the four-o'clock position to permit the apparatus 42 to further perform its operation on the receptacle 21 in the manner previously described for the apparatus 27.

Accordingly, it can be seen that as the folded receptacle 21 and arbor 43 advance beyond the four o'clock station of the wheel 27, the hold-down member 44 effectively holds the overlapping ends 22 and 23 of the blank 21 together until the same are firmly secured together, the hold-down member 44 conducting heat away from the overlapping seam of the receptacle 21 so that the heat sealing means can solidify and secure together the overlapping ends 22 and 23 of the blank 21 before the folded blank 21 and cigarettes 24 are ejected at the twelve o'clock station in the conventional manner.

Accordingly, it can be seen that not only has an approved method been provided by this invention for forming a receptacle having a heat sealed seam, but also an improved apparatus for making such a receptacle or the like is provided by this invention.

While the form of the invention now preferred has been disclosed as required by the statutes, other forms may be used, all coming within the scope of the claims which follow.

What is claimed is:

1. Apparatus for making a receptacle from a blank comprising a pair of folding means, means for moving said folding means toward each other to fold the opposed ends of said blank in overlapping relation, one of said folding means including a heating means to heat seal said overlapping ends together by engaging the outer overlapping end, and means to hold said overlapping ends together until said ends are secured together, said one folding means and said holding means being so constructed and arranged that the same are adapted to simultaneously engage the exterior of the overlapping end at an overlapping portion thereof during the heat sealing of said overlapping ends.

2. Apparatus as set forth in claim 1 wherein said one folding means fold said end of said blank that is disposed over the other end of said blank.

3. Apparatus for making a receptacle from a blank comprising a pair of folding means, a holding member, means for moving said folding means toward each other to fold the opposed ends of said blank in overlapping relation, said holding member being so arranged that the same temporarily halts the folding operation of one of said ends until the other end is in its final position to insure that said one end will be disposed over the other end in overlapping relation therewith, one of said folding means including heating means to heat seal said overlapping ends together, and means for moving said holding means against said overlapping ends to hold said overlapping ends together until said ends are secured together.

4. Apparatus as set forth in claim 3 wherein said folding means that includes said heating means is the folding means that folds said one end and causes the same to curl toward said holding means to be temporarily arrested thereby.

5. Apparatus for making a receptacle from a flat blank comprising a rectangular arbor, means for folding said blank around three sides of said arbor whereby the opposed ends of said blank extend beyond the fourth side of said arbor, a pair of folding means, means for moving said folding means toward said arbor to respectively fold said ends in overlapping relation against the fourth side of said arbor, one of said folding means including heating means to heat seal said overlapping ends together by engaging the outer overlapping end, and means to hold said overlapping ends against said arbor until said ends are secured together, said one folding means and said holding means being so constructed and arranged that the same are adapted to simultaneously engage the exterior of the overlapping end at an overlapping portion thereof during the heat sealing of said overlapping ends.

6. Apparatus as set forth in claim 5 wherein said one folding means fold said end of said blank that is disposed over the other end of said blank.

7. Apparatus for making a receptacle from a flat blank comprising a rectangular arbor, means for folding said blank around three sides of said arbor whereby the opposed ends of said blank extend beyond the fourth side of said arbor, a pair of folding means, a holding member, means for moving said folding means toward said arbor to respectively fold said ends in overlapping relation against the fourth side of said arbor, said holding member being so arranged that the same temporarily halts the folding operation of one of said ends until the other end is flat against said arbor to insure that said one end will be disposed over said other end in overlapping relation therewith, one of said folding means including heating means to heat seal said overlapping ends together, and means to move said holding means against said overlapping ends to hold said overlapping ends against said arbor until said ends are secured together.

8. Apparatus as set forth in claim 7 wherein said folding means that includes said heating means is the folding means that folds said one end and causes the same to curl toward said holding means to be temporarily arrested thereby.

9. A method for making a receptacle from a blank comprising the steps of moving a pair of folding means toward each other to fold the opposed ends of said blank in overlapping relation, heat sealing said overlapping ends together with one of said folding means engaging the outer overlapping end, and holding said overlapping ends together with holding means until said ends are secured together, said one folding means and said holding means being so constructed and arranged that the same are adapted to simultaneously engage the exterior of the overlapping end at an overlapping portion thereof during the heat sealing of said overlapping ends by said one folding means.

10. A method as set forth in claim 9 wherein said one folding means folds said end of said blank that is disposed over the other end of said blank.

11. A method for making a receptacle from a blank comprising the steps of moving a pair of folding means

toward each other to fold the opposed ends of said blank in overlapping relation, temporarily halting the folding operation of one of said ends by a holding member until the other end is in its final position to insure that said one end will be disposed over the other end in overlapping relation therewith, heat sealing said overlapping ends together with one of said folding means, and moving said holding means against said overlapping ends to hold said overlapping ends together until said ends are secured together.

12. A method as set forth in claim **11** wherein said folding means that heat seals said overlapping ends is the folding means that folds said one end and causes the same to coil toward said holding means to be temporarily arrested by said holding means.

13. A method for making a receptacle from a flat blank comprising the steps of folding said blank around three sides of a rectangular arbor whereby the opposed ends of said blank extend beyond the fourth side of said arbor, moving a pair of folding means toward said arbor to respectively fold the ends in overlapping relation against the fourth side of said arbor, heat sealing said overlapping ends together with one of said folding means engaging the outer overlapping end, and holding said overlapping ends against said arbor with a holding means until said ends are secured together, said one folding means and said holding means being so constructed and arranged that the same are adapted to simultaneously engage the exterior of the overlapping end of an overlapping portion thereof during the heat sealing of said overlapping ends by said one folding means.

14. A method as set forth in claim **13** wherein said one folding means folds said end of said blank that is disposed over the other end of said blank.

15. A method for making a receptacle from a flat blank comprising the steps of folding said blank around three sides of a rectangular arbor whereby the opposed ends of said blank extend beyond the fourth side of said arbor, moving a pair of folding means towards said arbor to respectively fold said ends in overlapping relation against the fourth side of said arbor, temporarily halting the folding operation of one of said ends by a holding member until the other end is flat against said arbor to insure that said one end will be disposed over the other end in overlapping relation therewith, heat sealing said overlapping ends together with one of said folding means, and moving said holding means against said overlapping ends to hold said overlapping ends against said arbor until said ends are secured together.

16. A method as set forth in claim **15** wherein said folding means that heat seals said overlapping ends together folds said one end and causes the same to curl towards said holding means to be temporarily arrested thereby.

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